PHILIPS „Miniwatt" SPECIAL VALVES

# HIGH-POWER OUTPUT PENTODE 4654




## CHARACTERISTICS

| | | | | | |
|---|---|---|---|---|---|
| Heater voltage . . . . | $V_f$ | = | 6·3 | | A |
| Heater current . . . . | $I_f$ | = | 1·35 | | V |
| Anode voltage . . . . | $V_a$ | = | 400 | 600 | V |
| Screen-grid voltage . . | $V_{g_2}$ | = | 425 | 400 | V |
| Suppressor-grid voltage. | $V_{g_3}$ | = | 0 | 0 | V |
| Anode current . . . . | $I_a$ | = | 45 | 22 | mA |
| Screen-grid current . . | $I_{a_2}$ | = | 5 | 2 | mA |
| Grid bias . . . . . . . | $V_{g_1}$ | = | -33 | -37 | V |
| Slope . . . . . . . . . | S | = | 6 | 4 | mA/V |
| AC resistance . . . . | $R_i$ | = | 30 | 50 | kΩ |
| Maximum output from two valves in Class AB push-pull with fixed grid bias . . . . . | $W_{omax}$ | = | 52·5 | 69 | W |
| Total distortion . . . | $d_{tot}$ | = | 3·7 | 5·2 | % |
| Required input per valve | $V_i$ | = | 25 | 25 | V (RMS) |
| Optimum load (anode to anode) . . . . . . . | $R_a$ | = | 5 | 10 | kΩ |

## SPECIAL ADVANTAGES

1. Very high efficiency
2. Large output
3. Comparatively low anode voltage

## DESCRIPTION

The 4654 is an indirectly heated 18 W output pentode, designed especially for Class AB push-pull stages. To avoid risk of arcing at the pinch, the valve has its anode connected to a top cap.
The suppressor grid is taken to a separate contact on the base, and the valve may accordingly be used as a transmitter. As an amplifier, the 4654 offers various possibilities; in addition to its application to power amplifiers, the valve may be used as a modulator. In the case of push-

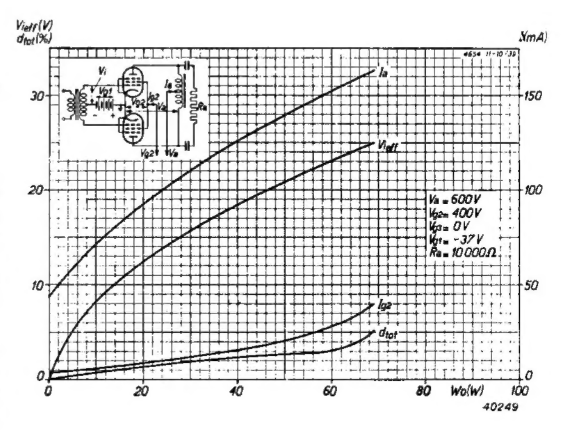



Fig. 2.

Anode current, screen-grid current, required input $V_{ieff}$ (RMS) and total distortion shown against output power for 2 valves 4654 in push-pull with fixed grid bias, $V_a$ = 600 V and $V_{g_2}$ = 400 V.

pull stages, it is inadvisable to employ high anode voltages unless the grid bias is fixed. With 600 V on the anodes and 400 V on the screen grids, a pair of valves will supply 69 W output, at 5·2% total distortion; to achieve this figure, it is necessary to keep the screen potential as nearly constant as possible. Alternative operating conditions are: anode voltage 400 V, screen-grid voltage 425 V; in that case, with fixed grid bias, the power output is 52·5 W, at 3·7% distortion; with automatic bias, the output is 30 W, the total distortion amounting to 10%. With the second set of operating conditions mentioned above there is the advantage that the screen grids may be connected directly to high-tension positive; the respective anode and screen potentials have been chosen to allow for a voltage drop of 25 V in the output transformer.

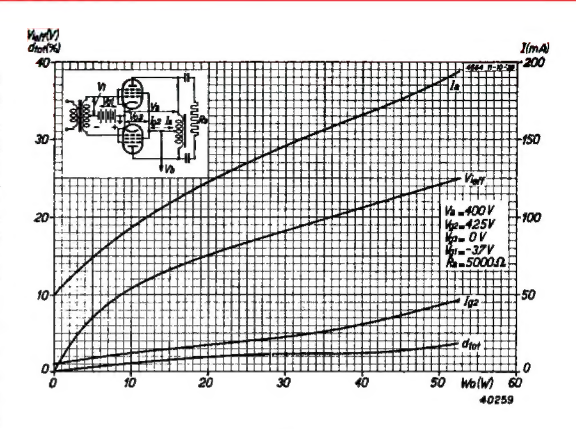
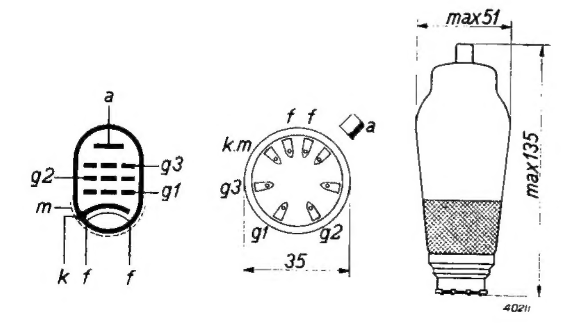



Fig. 3.

Anode current, screen-grid current, required input $V_{ieff}$ (RMS) and total distortion shown against ou'put power for 2 valves 4654 in push-pull with fixed grid bias. $V_a$ = 400 V and $V_{g_2}$ = 425 V.

For wavelengths down to 50 metres, the 4654 may be used for transmitting; in a telegraphy transmitter, a Class C stage using this valve provides a carrier-wave output of 36 W, the efficiency being 67%. The 4654 pentode is particularly suitable for combined anode and screen modulation; with an anode voltage of 200 V and -60 V grid bias, an output of 24 W is obtainable.




Arrangement of electrodes; connections and maximum dimensions in millimetres